INTELLIGENCE ENGINEERING SYSTEMS ANALYSIS COURSE

QUESTIONNAIRE

Name_____ Phone Ex._____

Office/Branch_____ Room No._____

Educational History_____

Please answer the following questions concerning the attached subject material:

1. In which topical areas do you feel the strongest?

2. In which topical areas do you feel the weakest?

3. What further topical areas would you suggest for inclusion, if any?

Return this Questionnaire to: [redacted] STAT
603 Ames Building

TOPICAL AREAS

I. Vectorial Representation of Variables: matrix formats; manipulations; vectorial products; orthogonality; independence; Fourier Series; Laplace representation convolution; Walsh Functions.

II. Linear System Variables: convolution; Laplace Manipulations; applications to linear differential equations; damping considerations; impulse responses; system flow diagram; Z Transforms; sampling; numerical methods; Gauss' elimination; matrix inversion; pictorial matrices; manipulation.

III. Probability and Statistics: concepts of discrete and continuous variables; sample space; union; intersection; independence; definitions; density function; distribution function, expectancy operator; moments; confidence limits.

IV. Stochastic Processes (I): stationary processes; approximations to Gaussian; filtering and averaging; correlation; convolution; cross-correlation; covariance matrix; power spectral estimates; bandlimiting effects.

V. Stochastic Processes (II): general review and exercise of modeling tools presented to date; concepts of signals and interference; properties of space and time variables in single dimension case; conditional probability; Baysian approaches.

VI. Detector Subsystems: one dimensional signal and noise; detection, decision threshold; optimum processing; receiver operating characteristics; interference effects from ambient noise, system noise, doppler, reverberation, channel uncertainty in a variety of applications.

VII. Detector Subsystems: optimum detection, prewhitening; Markov noise; detectability criteria; coherent processing; energy detection; confidence measures.

VIII. Space-Time Processing Subsystems: multisensor arrays; signal and noise matrices; prewhitening; matched filters; detection, averaging schemes.

IX. Spatial Processors: optimal arrays; lobes in time and space; coherency; detectability for several configurations; near field/far field considerations; non-planar wavefronts.

X. Servomechanism Subsystems: Linear models; closed loop and open loop response; root locus; Bode and Nyquist criteria; optimal control; common nonlinearities; phase-plane approach.

XI. Modulation Subsystems - Analog: amplitude, phase and frequency modulation models; deterministic vectorial and frequency models, noise consideration in design; sideband considerations; convolutions; demodulation schemes.

XII. Modulation Subsystems - Pulsed: PPM, PCM, PWM, etc. and other pulsed models were treated. Relationships between deterministic and band noise-limited cases; system noise and environmental noise budgets.